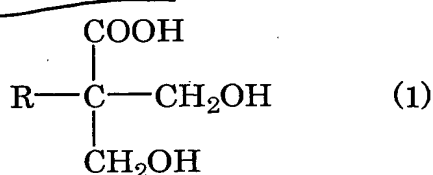


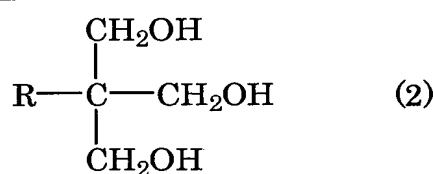
WHAT IS CLAIMED IS:

1. A method for producing a dimethylolcarboxylic acid represented by the following formula 1:

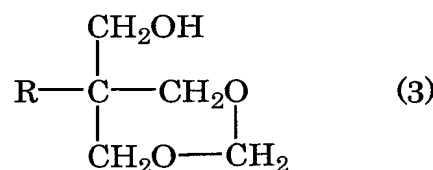


- 5 wherein R is a C₁-C₄ alkyl group,
which comprises:

a step A for reacting trimethylolalkane represented by the following formula 2:

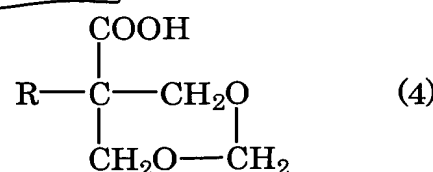


- 10 wherein R is as defined above,
with formaldehyde in the presence of an acidic catalyst, thereby producing a cyclic formal represented by the following formula 3 having a formal protecting group:



- 15 wherein R is as defined above;

a step B for oxidizing the cyclic formal produced in the step A using nitric acid as an oxidizing agent in the presence or absence of a catalyst, thereby producing a cyclic carboxylic acid represented by the following formula 4:



- 20 wherein R is as defined above; and

a step C for cleaving the formal protecting group of the cyclic carboxylic acid produced in the step B to obtain the dimethylolcarboxylic acid of the

formula 1.

2. The method according to claim 1, wherein R is methyl group or ethyl group.

3. The method according to claim 1, wherein formaldehyde is used in an amount of 0.1 to 1.5 mol per one mol of the trimethylolalkane.

4. The method according to claim 1, wherein the acidic catalyst used in the step A is at least one acid selected from the group consisting of hydrochloric acid, phosphoric acid, sulfuric acid, formic acid, p-toluenesulfonic acid and methanesulfonic acid.

5. The method according to claim 1, wherein the acidic catalyst of the step A is used in an amount of 0.1 to 2.0% by weight based on the trimethylolalkane.

6. The method according to claim 1, wherein the step A is carried out at 60 to 100°C for 30 to 300 min under ordinary pressure.

7. The method according to claim 1, wherein the step A is carried out at 100 to 150°C for 10 to 60 min under 0 to 0.3 MPa.

8. The method according to claim 1, wherein the catalyst of the step B is at least one compound selected from the group consisting of sulfuric acid, sodium nitrite, ammonium vanadate and vanadium(V) oxide.

9. The method according to claim 8, wherein nitric acid is used in an amount of 1.5 to 3.0 mol per one mol of the cyclic formal.

10. The method according to claim 1, wherein the step B is carried out at 30 to 100°C for 1 to 5 h.

11. The method according to claim 1, wherein the cleavage of the formal protecting group of the cyclic carboxylic acid in the step C is carried out by hydrogenation in the presence of a noble metal catalyst, a nickel catalyst or a copper-chromium catalyst.

12. The method according to claim 11, wherein the cleavage by hydrogenation is carried out under a hydrogen pressure of 0.2 to 15.0 MPa.

13. The method according to claim 11, wherein the cleavage by hydrogenation is carried out at 120 to 200°C for 30 min to 5 h.

14. The method according to claim 1, wherein the cleavage of the formal protecting group of the cyclic carboxylic acid in the step C is carried out by heating a solution of the cyclic carboxylic acid in a C₁-C₄ alcohol in the presence of an acidic catalyst.
- 5 15. The method according to claim 14, wherein the acidic catalyst is at least one acid selected from the group consisting of phosphoric acid, sulfuric acid, p-toluenesulfonic acid and methanesulfonic acid.
16. The method according to claim 14, wherein the acidic acid is used in an amount of 500 ppm to 5% by weight based on the cyclic carboxylic acid.
- 10 17. The method according to ~~claim~~ claim 14, wherein the solution of the cyclic carboxylic acid is heated at 60 to 200°C for 1 to 5 h.